**EMERALD ROYAL INTERNATIONAL SCHOOL, MPAPE ABUJA**

**LESSON PLAN AND NOTE FOR WEEK 1 ENDING FRIDAY: 13th JANUARY, 2023**

**TERM:** 1st

**WEEK:** 1st

**DATE** : 9th – 13th January 2023

**SUBJECT:** Physics

**CLASS :** SS 2

**TOPIC:** Sound Waves

**SUB - TOPIC:** i. Sources of sound

ii. Transmission of sound

iii. Characteristics of sound

**PERIOD:** 5th

**TIME:** 11:10 - 11:50am

**DURATION:** 40 minutes

**AVERAGE AGE:** 16 years

**NUMBER IN CLASS:** 5

**SEX:** Mixed

**SPECIFIC OBJECTIVES:** By the end of the lesson, students should:

1. State the sources of sound
2. Explain transmission of sound
3. Explain the characteristics of sound

**RATIONALE:** To enables students understand the concept of fields

**PREVIOUS KNOWLEDGE:** Students have being taught sound waves

**INSTRUCTIONAL RESOURCES:** Charts showing sources and transmission of sounds waves

**REFERENCE:** Senior Secondary School Physics by P.N. Okeke et al, New School Physics for Senior Secondary Schools by Anyakoha, M.W, Comprehensive Certificate Physics by Olumuyiwa Awe and Okunola, O.O, Science Teachers Association of Nigeria Physics for Senior Secondary School, Book 1. New Edition and Melrose Physics for Senior Secondary School, Book 1 by Akano, O and Onanuga, O.O.

**LESSON DEVELOPMENT**

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| **STEPS** | **TEACHER’S ACTIVITIES** | **STUDENTS’ACTIVITIES** | **LEARNING POINTS** |
| **INTRODUCTION** | The teacher introduces the lesson by asking the following questions::   1. What is sound? 2. State the sources of sound 3. State the characteristics of sound | The students respond based on their previous knowledge | To arouse the students interest toward the lesion. |
| **STEP 1** | The teacher explains the sources of sound | The students pay attention. | To keep them focus. |
| **STEP 2** | The teacher explains the transmission of sound | The students listen carefully | To encourage critical thinking |
| **STEP 3** | The teacher lists and explains the characteristics of sound waves. | The students participate in the class discussion | To encourage students retentiveness |
| **BOARD SUMMARY** | **Sub topic 1: Sources of sound**  Sound is a form of wave motion which is conveyed through an elastic medium from a vibrating body to a listener. It is a longitudinal wave. Sound has a number of sources including sound from animals, moving aircraft, vehicles, vibrating turning fork, e.t.c  Sound wave is also a mechanical wave. That is, it cannot travel through vacuum. There must be a material medium for its to propagate. Astronauts on the moon can only communicate each other via walkie-talkie even at close distance because there is no air molecule to propagate sound wave on the moon.  **Sub topic 2: Transmission of sound**  Sound waves are produced from vibrating systems and travels as a series of compressions and rarefactions as discussed earlier. Sound waves do not travel through a vacuum. It requires a material medium. Your teacher will show you a simple experiment to investigate this fact. Speed of sound varies from medium to medium because it depends on the density, elasticity and temperature of the transmitting medium. For example, the speed of sound in air is about 330m/s at 00 C. in water it is about 1500 m/s. in steel rods, it can be as high as 5000m/s. wind also affect the speed of sound in relation to a listener. A louder sound is heard if the direction of travel of the wind is the same as the direction of propagation of the sound. If the two directions are opposite, the sound will decrease. In air the speed of sound increases by about 0.6m/s for each degree rise in temperature. The rise is much less in solids and liquids  As mentioned earlier, the speed of sound varies with density and the elastic properties of the medium. Experiment shows that, the velocity ‘v’ of sound is proportional to the Young’s modulus (E) of elasticity and the density, ‘d’ according to the equation:  . In gas, it is independent of pressure and proportional to the absolute temperature of the gas.  **Some applications of sound waves**   1. **Echoes**: an echo is a sound heard after the reflection of sound waves from a plane surface. Echo can be used to determine the speed of sound in air. 2. **Echo sounding devices**: Sonar is an echo sounding device which can be used on a ship to determine the depth of the sea. When a sound wave is sent into the sea bed, it get reflected back in time ‘t’ seconds after striking the sea bed. The time of travel of the wave can be measured using a stop watch and since the speed of sound in water is known, the depth of the sea can thus be calculated using the equation: speed (v) = distance () /time (t). since distance =2   reflector  x  Source of sound   1. **Exploration of natural resources (oil and gas):** geophysicists can use the principle of echo to detect the presence of mineral resources in the ground. To do these, a small explosion is set off on or just below the earth’s surface. The sound waves will be reflected by different layers of underground rocks. The Geologists can use the nature of each echo and the time it takes each echo to reach the surface to detect the presence of some mineral resources. 2. **Reverberation:** Reverberation is a phenomenon that occurs as a result of multiple reflections of sound waves from walls, roof and floor of a large hall. Some rooms and halls are padded to minimized or control reverberation. 3. **Beat:** This is a phenomenon whereby two notes of nearly equal frequency (pitch) are sounded together resulting to a rise and fall of intensity of the sound. This happens as a result of constructive interference of sound. The beat frequency is the difference in the frequencies. 4. **Doppler Effect:** This is a change in frequency (pitch) of a source when there is a relative motion between the source and the observer. For example, if you are stationary, and an ambulance with siren passes with speed, you will observe a sudden drop in the pitch of the sound.   **Sub topic 3: Characteristics of sound**  A musical note is a sound which originates from a source that is vibrating at certain set frequencies. Noise is produced by sources vibrating with no definite frequency. Musical notes are characterized by pitch, quality and loudness.  **Pitch:** Pitch is the characteristic of a note which enables us to differentiate a high note from a low one. Pitch depend on frequency  **Quality:** The quality of a note is the characteristic that distinguishes it from another note of the same pitch and loudness when played on musical instruments. The quality of the note ‘C’ played on a piano is different from that of the middle ‘C’ played on a violin. Musical instruments consist of sound of different frequencies blended together. That is why they cannot give out pure tones. The strongest audible frequency in the instrument is the fundamental frequency ‘fo’ others are integral multiples of fo such as, 2fo, 3fo, 4fo. e.t.c. These are called overtones or harmonics.  **Intensity and loudness:** The intensity of sound at a certain place is the rate of flow of energy per unit area perpendicular to the direction of the sound wave.  **Loudness:**  is a sensation in the mind of an individual observer, depending on the intensity of sound.  Summarily;   |  |  |  | | --- | --- | --- | |  | **Characteristics of sound** | **Factor affecting the characteristics of sound** | | 1 | Pitch | Frequency | | 2 | Intensity /loudness | Amplitude | | 3 | Quality | Harmonics |   Note that not all sounds can be heard by the human ear. The human ear can respond to sounds of frequencies ranging between 20Hz to 20000Hz. Sounds with frequencies much above these are called ultra sounds | The students copy notes into their exercise book | For future reference. |
| **Evaluation** | The teacher evaluates the students with the following questions:   1. List the sources of sound 2. Explain transmission of sound 3. State the characteristics of sound waves | The students attempt the questions. | To ascertain their level of understanding. |
| **Conclusion** | The teacher concludes the lesson by making corrections where necessary and go through their notes. | The students copy the note on the board. | For future use. |
| **Assignment** | The teacher gives the students assignment as follows:   1. Sound require a material medium for its propagation true or false? 2. Mention 5 sources of sound waves 3. What is an echo? Give 2 applications of echo | The students copy assignment solve at home and submit for marking endorsement. | To encourage further studying at home. |



7/3/2023

Principal Head Instructor

NOTE: Effect the same correction if need be and in others as well.